An evaluation tool as a means of improving architectural design quality: the results

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Abstract

Development of the Architectural Design Quality Evaluation Tool was based on a live research project with a Metropolitan Council in the North of England. The aim was to improve the quality of design in residential sheltered housing, procured through the Private Finance Initiative; and has been applied to a programme that will see the replacement of the Council's entire sheltered housing stock. The Private Finance initiative has been subjected to particular criticism for its lack of design quality. The Research Team worked alongside the Local Authority Project Team, and together they developed and refined the Tool through the competitive dialogue phase of the PFI programme. At the CIB World Congress 2010, the authors reported on the development of the Tool (Paper ID: 535). This paper will briefly review the nature of evaluation tools and this tool in particular, before analysing its use in practice and the results. The Tool has two functions. It is a substantial part of the assessment process, which selected the preferred bidding consortium from the original six bidders, through a series of stages. However, it was also directed at improving the quality of all the submitted designs through an iterative process. There are several mechanisms available for evaluating the performance attributes of buildings and these are important, but few also tackle the less tangible amenity attributes, which are vital to the feeling of home. This Tool emphasises the amenity attributes without neglecting performance. The complete Tool and User Guide can be found on the Homes and Communities Agency website under Design and Sustainability at http://www.homesandcommunities.co.uk/architecture-design-quality-evaluation-tool

Keywords: **sheltered housing, architectural design quality, evaluation of design quality, private finance initiative, local authority.**

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1. Introduction

1.1 Summary of CIB World Congress 2010 paper: Architectural Design Quality in Local Authority Private Finance Initiative Projects (Giddings et al, 2010).

Since the 1990s, when the Private Finance Initiative was developed as the primary method for delivering major public capital projects, it has been criticised for lack of design quality in the buildings that it produced. The British Government became sufficiently concerned about this deficiency that it encouraged the Commission for Architecture and the Built Environment and the Office of Government Commerce to develop recommendations to improve design quality; and it was greatly assisted by the 2004 EU Directive that enabled authorities to discuss all aspects of the proposals with the bidders. This paper reported on a research project being carried out with a metropolitan local authority in North of England, which is replacing its entire sheltered housing stock in one Private Finance Initiative project. The paper reviewed the Private Finance Initiative management processes in relation to architectural design quality at each of the selection stages, including the generation and application of the design assessment criteria, and the role of user groups; and evaluated the outcomes against the objectives of maximising design quality within workable financial models. The methodology was that the researcher was based in the local authority project team, and has therefore been able to use participant observation techniques in the management processes that include competitive dialogue and user consultation. The principal aim of the local authority is that it should receive these buildings as assets, rather than liabilities at the end of the 30 year period. It was concluded that a design evaluation tool would need to be employed to ensure that design quality was being improved throughout the bidding process. Having assessed the existing design quality evaluation tools, it was concluded that none of them suited the PFI selection process. A new tool based on the hierarchical model, was generated mainly from academic literature. It was specifically devised to become increasingly more detailed at each stage. In its stage 3 form, the tool was making a significant contribution to the final selection of the consortia, who will undertake this ground-breaking project for the Council.

The novelty of this research is in three main areas. First, the competitive dialogue enabled bidders to develop their proposals through feedback based on the evaluation tool. Secondly, the engagement of the design champion, independent design advisers and the user group ensured that design quality remained a high priority throughout the selection process; and enabled different perspectives to be incorporated. Thirdly, the evaluation tool itself could be used by future project teams without the need for explanatory seminars or approved facilitators, such as those required by the Design Quality Indicator. In addition, it offers objective decision-making in staged selection of proposals, and bidders have observed the unprecedented rigour of the feedback; both in the selection of unsuccessful candidates and improvement in specific aspects of successful designs.

1.2 The Project

An ageing population represents one of the most extraordinary social transformations that has characterised and will continue to characterise British society. The heightened hope of living longer and the increase in the number of elderly citizens represents a challenge for all local authorities. North Tyneside Council, a large metropolitan local authority in the north east of England, faces a particularly radical social change with housing stocks that are unlikely to meet future needs. Therefore the Council included in its strategic plan (North Tyneside Council 2007) provision to replace its existing sheltered housing schemes with 10 new build developments and 16 refurbishments. The intention was to increase both the quantity and quality of its provision. The Council concluded that the only feasible method of funding this huge transformation was through the Private Finance Initiative, and successfully applied to the Government for over £100 million of PFI credits. From the beginning, the Council was keen to produce high quality buildings, and its first priority was to act on the recommendations of CABE (2005) and the Treasury Taskforce (Office of Government Commerce 2007).

2. Assessment of Design Quality

Table 1 shows existing evaluation tools that could be applied to sheltered housing.

Table 1: Existing Evaluation Tools

tool and who developed it	**year started and building type**	**critique**
Housing Quality Indicators (HQI) The Housing Corporation, and inherited by the Homes and Communities Agency (HCA)	1996 housing projects	Useful structuring for assessment and scoring scheme. Devised for general purpose housing and therefore does not map directly onto needs of sheltered housing. Responses in terms of *yes/no/not applicable* limits quality assessment, especially in the case of multi-part questions eg *2.2 Are the buildings in context with local buildings, street, patterns (form, mass, detail and materials)? Enter not applicable for-surrounding local environment is of poor visual quality.* http://www.homesandcommunities.co.uk/hqi Following the establishment of the HCA, it inherited differing design standard requirements. In spring 2010, it consulted on a potential set of core future design and sustainability standards. In November 2010, the Housing Minister confirmed that the HCA would not progress these new standards, but would retain the existing ones. http://www.homesandcommunities.co.uk/ourwork/design-and-sustainability-standards
Sheffield Care Environmental Assessment Matrix (SCEAM) University of Sheffield	1999 nursing homes	The objective of this tool is to systematically investigate relationships between the physical environment of nursing homes; and the quality of life of residents, and the job satisfaction and morale of care staff. Thus it is applied to buildings in use and not really applicable to the evaluation of design proposals (Parker et al., 2004).
Building for Life CABE	2001 houses and neighbourhoods	Based on only 20 criteria and therefore generic issues. Produced to assist local authority planners, and therefore includes planning issues that are not applicable to sites that have already been selected; and only a proportion of the criteria are related to the actual design quality of proposals. Devised for general purpose housing and therefore does not map directly onto needs of sheltered housing http://webarchive.nationalarchives.gov.uk/20110107165544/http:/www.buildingforlife.org/criteria/

Design Quality Indicator (DQI) Construction Industry Council	2002 all building types	Originally created to assess completed buildings – later expanded to five phases including design. The calculation of scores is based on an aggregation of a set of individual opinions provided by various people (Eley, 2004) identified as stakeholders. The process involves a questionnaire and workshops. The 90 questionnaire statements are generic (to cover the range of building types) eg *the lighting is versatile for different user requirements* (CIC, 2003) which could be difficult to assess at design stage – especially by lay people. The explorative style of workshops is inconsistent with the competitive dialogue procedure - in terms of specification of the contracting authority, confidentiality and equal treatment of bidders (HM Treasury, 2008).
Evaluation of Older People's Living Environment (EVOLVE) University of Sheffield and University of Kent	2010 sheltered housing and care homes	Established to assess occupied buildings but notes that it can be used to evaluate buildings at design stage. It is well structured in six sections. However, the assessment of design only relates to internal matters. There is a section on site and location, but it is restricted to access to local services. This is not especially useful as the sites will be pre-selected. Thus, there is not evaluation of context, external space and building form. Nevertheless, there are nearly 2000 questions for the remaining two thirds of the issues. In addition, the responses are – *yes/no/not in use/not applicable* – so it would be difficult to achieve assessments in terms of qualitative gradings for a number of schemes and several bidders in a competitive environment. http://www.housinglin.org.uk/Topics/browse/Design/DesignGuides/?parent=6594&child=7997

While the existing evaluation tools provide useful benchmarks, and some offer a means of structuring the evaluation - none were totally applicable in the context of competitive bidding, competitive dialogue, raising the standard of all design proposals, and contributing to decisions as to which bidders should proceed to the next stage; and ultimately the selection of the preferred bidder. Nevertheless, the urgency of the PFI programme led to the inevitable conclusion that one of the existing tools would have to suffice. On 6 May 2010 both the General Election and Local Elections took place. Immediately, the new Mayor halted all capital projects while a review took place. This was closely followed by the new Government's Comprehensive Spending Review. As the PFI project was unable to progress for several months, the opportunity was taken to develop an Architectural Design Evaluation Tool for Sheltered Housing.

3. The Architectural Design Evaluation Tool for Sheltered Housing

3.1 Literature Review

The Royal Fine Arts Commission had been enquiring into designs for buildings of public importance referred to it by Government Departments, since 1924. However, the New Labour Government from 1997 attacked what it perceived to be poor design quality in all aspects of the built environment and pledged a radical improvement – not least in the design of housing (Carmona, 2001). In 1999, it replaced the RFAC with a better resourced, more focussed adviser in the Commission for Architecture and the Built Environment (CABE). This Commission employed skilled staff and leading consultants to produce an extensive literature on how to achieve high design quality. The period from 1997 to 2011 represents unprecedented attention to design in the built environment of this country. In addition to the design guidance, many academic journal papers were published. Therefore, the literature

review for the development of the Design Quality Evaluation Tool consulted 120 of these papers to determine which they perceived as the seminal works in the study of the nature of home and the principles of design quality. The publications in Table 2 were referenced more extensively than any others and therefore formed the basis of the literature review for the formulation of the tool. In addition, a review of reports and guides on design quality in homes and housing over the 1997-2011 period, provided performance data for the Tool, and these publications are listed in Table 3. Unfortunately, the new Conservative Government withdrew CABE's funding, and as a result from 2011, its operation was seriously diminished.

3.2 Scoring the Criteria

A small group comprising the Researcher and three members of the Project Team assessed all the schemes against the criteria. The quality of design response to each criterion was measured on a 7 point Likert Scale (Miller and Salkind, 2002) as follows:

6 – Outstanding
5 - Excellent
4 - Very Good
3 - Good
2 - Average
1 - Minimal

0 – Criteria not met

In addition, the assessors were required to provide a written justification for each score.

Table 2: Seminal Publications referenced in the Tool

Alexander 1977;1979;2002	Low 1990;1992;1996
Altman 1975;1976;1977a;1977b,1985a;1985b; 1991;1992;1993;1994	Macmillan 2003;2004;2005,2006
Appleyard 1979	Marcus 1974;1976; 1995;1997;2006
Barnes 2001;2002;2006	Maslow 1943; 1954;1968
Benjamin 1995	Moore 1991;1993;1995;1998;2000a;2000b
Buttimer 1976;1980a;1980b	Newell 1992;1994;1995
Canter 1977;1983;1993	Newman 1972;1973
Chaudhury 2005	Nezlek et al. 2002
Day 1990;1998;2002;2004	Norberg-Schulz 1965;1971;1979;1980
Douglas 1980;1991;1998	Porteous1976;2001
Dovey 1978;1985;1990;2005	Proshansky 1978;1983
Duncan 1989;1992a;1992b;1993;1996	Rapoport 1980;1981;1982;1990;1995;1998;2005
Dupuis and Thorns 1996;1998	Relph 1976;1981;1993;1996;1997;2000;2008
Feldman 1990;1993;1996	Rowles 1983;2005a;2005b;2006
Gann 2001;2002;2003a;2003b	Salingaros 1995;1998;1999a;1999b;2000
Gesler 1991;1992;1993;1996;1998; 2009	Saunders 1988;1989;1990a;1990b
Giuliani 1991;1993	Seamon 1979;1980
Gurney 1990;1996;1997	Shumaker 1981
Hanson J (2001)	Sixsmith 1986; 1990;1991
Hay 1998a;1998b	Smith1994;2001
Hayward 1975,1977	Somerville 1992;1994;1997
Heidegger 1962;1971;1993	Thorns 1996;1998;1999
Hertzberger 1998;2000	Tognoli 1982; 1987
Lawrence 1987a ;1987b;1995;2002	Torrington 1996;2001;2004;2007
Lawson 2001;2003;2005	Tuan 1974;1977;1980
Lawton 1975;1980;1985;1989;1990;1994;1996; 1997;1998;1999;2000;2001	Ulrich 1983;1984;1991
	Werner 1985;1986
	Whyte 2001;2003a;2003b

Table 3: Reports and Design Guides referenced in the Tool

Association of Chief Police Officers Crime Prevention Initiatives (2004) Secured by Design Principles
CABE (2008) Delivering great places to live: Building For Life
CABE (2009) Homes for our old age: Independent living by design
Care Services Improvement Network (2008) Design Principles for Extra Care
Department of Justice (1994) 28 Code for Federal Regulation Part 36 ADA Standards for Accessible Design
Design Principles for Extra Care (2008)
Goodman C (2011) Lifetime Homes Design Guide, IHSBRE press
Housing Corporation (2007) Design and quality standards, London, The Housing Corporation
Housing Corporation (2008) Housing Quality Indicators
Littlefield D (2008) Metric Handbook: planning and design data, 3rd ed., London, Architectural Press
North Tyneside Council (2007) Housing Strategy 2006-2010
Thorpe S and Habinteg Housing Association (2006) Wheelchair Housing Design Guide (WHDG) (2nd edition), BRE Press

3.3 Conceptual Framework and Weighting the Criteria

The debate about measurement of design quality has a long history, and this is reflected in the literature, especially from the era in which the Design Quality Indicator appeared as the first comprehensive system 'to measure quality of design embodied in the product – buildings themselves' (Gann et al., 2003). However, the importance of differentiating between performance and amenity goes back to Burt (1978). Therefore, any assessment of quality would benefit from an appropriate means of evaluating both performance and amenity, in addition to assessing their integration into the design as a whole (Giddings and Holness, 1996). This notion was supported by Manning (1991) who established the distinction between Environmental Quantities and Environmental Qualities; and by Thomas and Carroll (1984) who identified a continuum between Practicality and Originality.

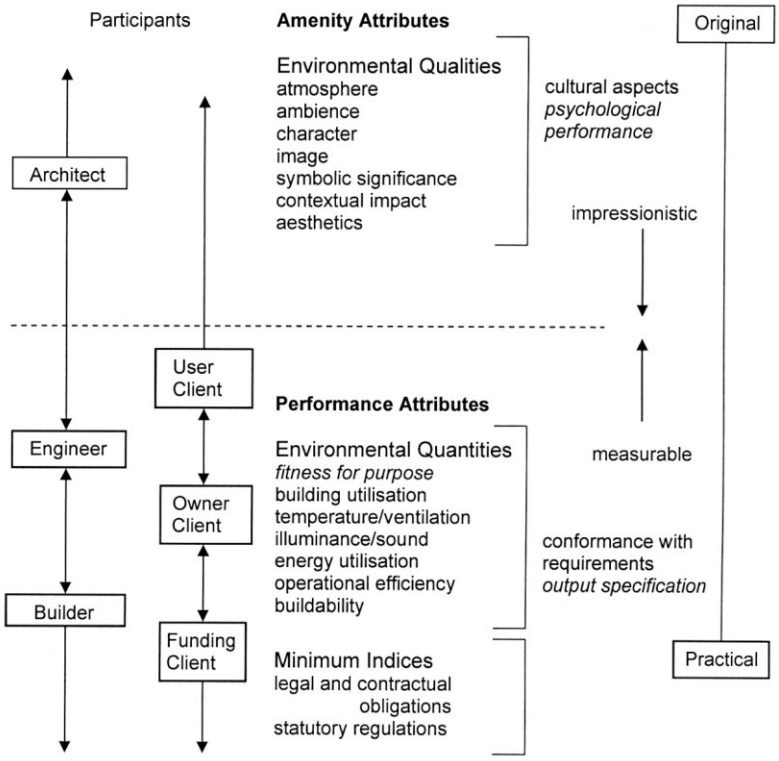

Figure 1: Quality Hierarchy Diagram

Exploration of all these attributes led to the development of a Quality Assessment Hierarchy. Although originally devised for use in design award schemes; as Gann et al. (2003) point out, it can equally well be applied to the quality of design proposals. Figure 1 represents a summary of the Quality Assessment Hierarchy. For further information about its development, please see Giddings and Holness (1996).

From the beginning, the importance of the amenity attributes was emphasised. At the presentations by the independent advisers' from Northumbria University in December 2008, the primary objective was to provide supplementary guidance for bidders. Councillors (including the Design Champion) and representatives of the Users' Group were also present. The presentations focussed almost entirely on amenity attributes, and were based around people and places. This follows the principle of the Quality Assessment Hierarchy in which performance cannot be neglected but criteria demonstrating greater amenity are weighted higher on a linear scale, ie 1-3 for performance attributes and 3-5 for amenity attributes (Sudha and Baboo, 2011). The mean weighting of the criteria in each category is shown on Table 4. It is presented with the categories in hierarchical order, ie communal spaces have the greatest tendency towards the amenity attributes whereas service spaces tend mostly towards the performance attributes.

Table 4: Summary of Categories

category	percentage allocation		mean weighting
	new build	refurbishment	
Communal Spaces	17%	20%	4.44
Context	7%	7%	4.10
Building Form	14%	10%	4.00
Apartments	11%	10%	3.00
Circulation Spaces	10%	10%	2.93
External space	14%	13%	2.80
Entrances	10%	11%	2.63
Architectural Components	7%	7%	2.00
Services Spaces	10%	12%	1.90

Once all the criteria have been scored, each is multiplied by its weighting and the total weighted score for the category calculated. This figure is multiplied by the percentage allocation (as shown in Table 4). The resulting scores from each category are then aggregated to find the total score for the scheme (see Table 5). The percentage allocations had been previously agreed between the Project Team and the Users' Group. It should be noted that they vary between new build and refurbishment. Participants in future projects may decide on different percentages to suit their particular needs.

4. Visualisation of the Results

The evaluation took place in three stages. The first stage was aimed at reducing the original six consortia to three bidders. The second stage reduced the number from three to two, and the objective of the third stage was to select the preferred bidder. At the final evaluation stage, ie selection of the preferred bidder, designs for all 26 schemes were produced. The Research and Project Teams concluded that, even at this late stage, there should be

opportunity for the bidders to improve their designs through an iterative process resulting from a series of reviews. However, it should not be forgotten that both the revision of designs and the review process are very resource intensive in terms of time and money. The balance was struck at three reviews. Thus, there was output from 26 schemes x 3 reviews x 2 bidders = 156 results. It was concluded that the most effective way of presenting the results would be one graphical sheet per review – generating 156 sheets. Each review sheet needed an overview but also sufficient detail to enable bidders to target specific areas for improvement after Reviews 1 and 2. The top row of the sheet includes a spider diagram as a summary showing overall strengths and weaknesses. The score for each category is also shown in percentages, together with a build-up of the total score from the categories. The remainder of the sheet illustrates the nine categories with percentage scores for each group of criteria (see Figure 2).

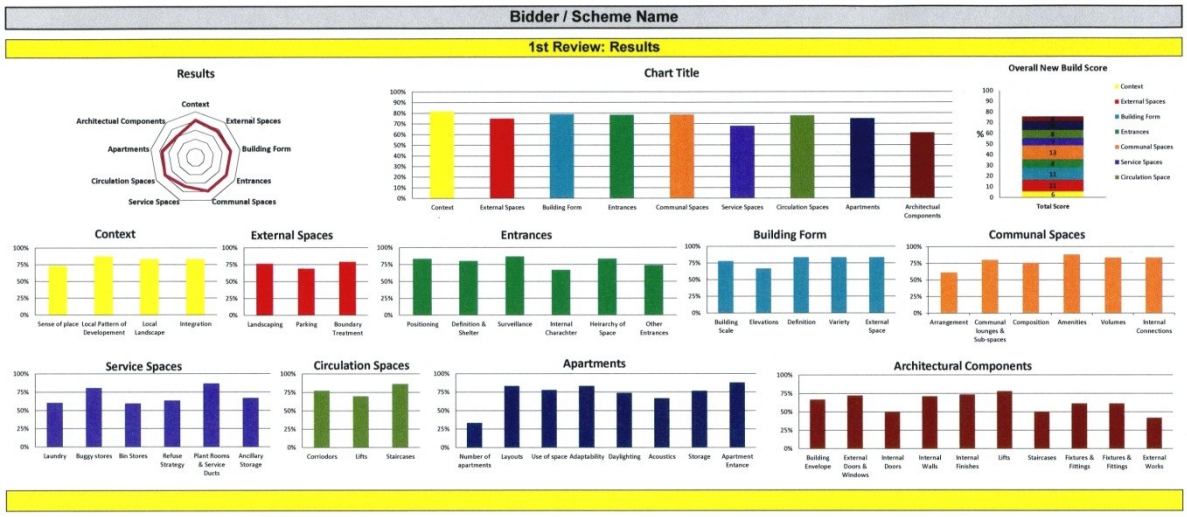

Figure 2: Results of Evaluation of Design for Crummock, Bidder S, Review 2

All the results from the final evaluation stage are summarized in Table 5.

Table 5: Results for all designs – Stage 3, Bidders S and T, three Reviews

Summary of Results: New Build (in %tages)

Bisley		Bristol		Broadway		Chapelville		Clifton		Scheme
S	T	S	T	S	T	S	T	S	T	Bidder
59.1	42.8	59.5	57.1	52.8	60.6	63.4	56.2	77.6	65.3	Review 1
80.5	66.1	76.0	61.1	70.3	71.7	73.5	66.7	83.0	77.2	Review 2
80.7	70.3	78.4	66.3	72.2	73.8	74.0	68.5	83.7	80.6	Review 3

Crummock		Eldon		Marsden		Phoenix		Roseberry		Scheme
S	T	S	T	S	T	S	T	S	T	Bidder
66.0	62.5	74.5	59.3	61.1	51.4	55.6	57.5	58.4	38.5	Review 1
76.3	70.9	76.9	67.3	71.1	61.4	73.8	66.0	77.4	70.4	Review 2
76.6	72.5	79.2	69.1	72.2	62.5	74.2	71.3	77.6	72.4	Review 3

Summary of Results: Refurbished (in %tages)

Carlton		Carville		Cheviot		Eccles		Scheme
S	T	S	T	S	T	S	T	Bidder
64.4	56.8	57.8	53.1	57.2	47.0	50.7	47.7	Review 1
75.9	62.2	74.2	69.4	74.8	61.3	76.8	60.5	Review 2
77.9	64.0	74.6	73.3	75.1	65.0	77.2	64.8	Review 3
36.7		33.5		36.1		20.6		Existing
41.2		41.1		39.0		56.6		Value Added

Emmerson		Feetham		Ferndene		Fernlea		Scheme
S	T	S	T	S	T	S	T	Bidder
50.7	50.6	62.5	51.9	50.1	47.6	61.0	57.3	Review 1
60.5	56.5	72.1	70.4	73.5	68.5	70.2	67.0	Review 2
61.9	59.5	73.7	72.3	78.0	75.3	70.8	67.7	Review 3
35.6		44.3		33.3		28.3		Existing
26.3		29.4		44.7		42.5		Value Added

Orchard		Preston		Rosebank		Rudyard		Scheme
S	T	S	T	S	T	S	T	Bidder
57.6	59.1	61.9	55.6	54.5	47.5	58.0	53.1	Review 1
67.3	61.7	73.0	66.9	70.5	60.1	72.6	56.5	Review 2
68.7	62.2	76.6	71.7	70.6	63.8	74.1	59.9	Review 3
28.2		41.9		30.4		45.6		Existing
40.5		34.7		40.2		28.5		Value Added

Skipsey		Southgate		Tamar		Victoria		Scheme
S	T	S	T	S	T	S	T	Bidder
58.2	48.5	58.6	66.1	64.6	42.9	61.7	65.3	Review 1
68.5	59.8	77.7	68.3	74.9	63.3	68.2	70.1	Review 2
69.4	61.2	78.2	68.7	77.1	64.5	69.4	70.6	Review 3
35.3		53.4		30.3		36.6		Existing
34.1		24.8		46.8		32.8		Value Added

5. Analysis and Discussion

In new build and refurbishment proposals, both bidders received relatively low scores at Review 1, although Bidder S scored higher than Bidder T for virtually all schemes. The spread of results, as indicated by the standard deviations, was relatively large for new build but less in the refurbishment schemes. The feedback from Review 1 seems to have been effective, as on average Bidder S improved their score by 20.9% for new build in Review 2, and Bidder T by 23.2% while the standard deviations reduced by 3.98 and 3.68 respectively. The improvement in the refurbishment schemes was similar as Bidder S improved their score by 23.8% and Bidder T by 20.3%. The standard deviations started from a narrower position and therefore the reductions were less dramatic at 0.32 and 1.85 respectively. The improvements from Review 2 to Review 3 were noticeably more modest. For new build the change was only 1.3% for Bidder S and 4.1% for Bidder T; with equally small changes in standard deviation (0.16 and 0.06). In the refurbishment projects the change was only 1.9% for Bidder S and again 4.1% for Bidder T. The standard deviation for both bidders actually increased by 0.21 and 0.22 respectively (see Table 6). The Review Team concluded that the introduction of two Reviews had been worthwhile as there had been significant improvements, but that Review 3 would probably be discontinued in future. The margins between the two bidders decreased with each successive Review for new build (14.0%, 11.8%, 8.8%) but did not follow the same pattern for the refurbishment projects (9.4%, 12.5%, 10.2%). The objective of raising the design standard of all schemes was achieved, but Bidder S maintained a clear advantage throughout all the Reviews. The notion of scoring the existing buildings and demonstrating the value added was adopted quite late in the process. The differences between the existing and proposed for Bidder S are shown on Table 5. The average increase in value was 106%. It was eventually realised by the Project and Research Teams that the potential of the tool could be enhanced if all existing buildings were to be scored at an early stage as part of the decision-making on prioritising cases for redevelopment and refurbishment.

Table 6: Analysis of Results

Reviews	Bidder S		Bidder T	
	mean	standard deviation	mean	standard deviation
New Build: 10 Schemes				
1	62.8%	7.92	55.1%	8.55
2	75.9%	3.94	67.9%	4.87
3	76.9%	3.78	70.7%	4.81
Refurbishment: 16 Schemes				
1	58.1%	4.65	53.1%	6.59
2	71.9%	4.33	63.9%	4.74
3	73.3%	4.54	66.5%	4.96

The Project and Research Teams were confident that the Tool had provided both a means for improving the design quality of all the schemes and demonstrated which bidder offered higher quality design. However, the Treasury Task Force (2007) had stated the need to ensure that design proposals are consistent with the budget available for the project. There have been anecdotal assertions, especially in PFI projects, that an increase in design quality would render the projects unaffordable. The use of the Tool and the presentation of results from the Reviews, enabled Bidders to model specific design changes in relation to their effect on projected expenditure. Informal feedback from the Bidders made it clear that they had tested different options for particular design changes, against the model for the budget. The financial projections are shown alongside the budget on Figure 3. Contrary to unsubstantiated opinion (Evans and Hartwich, 2005), both bidders were within budget and followed a similar profile. Overall, Bidder S was more economical than Bidder T, through the tactic of accelerating the construction period by 12 months. Increasing the rate of construction emphasises the need to carefully monitor the build quality; and highlights a critical period when expenditure equals the budget. If Bidder S is selected as the preferred bidder, the Project Team will need to be very vigilant about these two issues during the construction period.

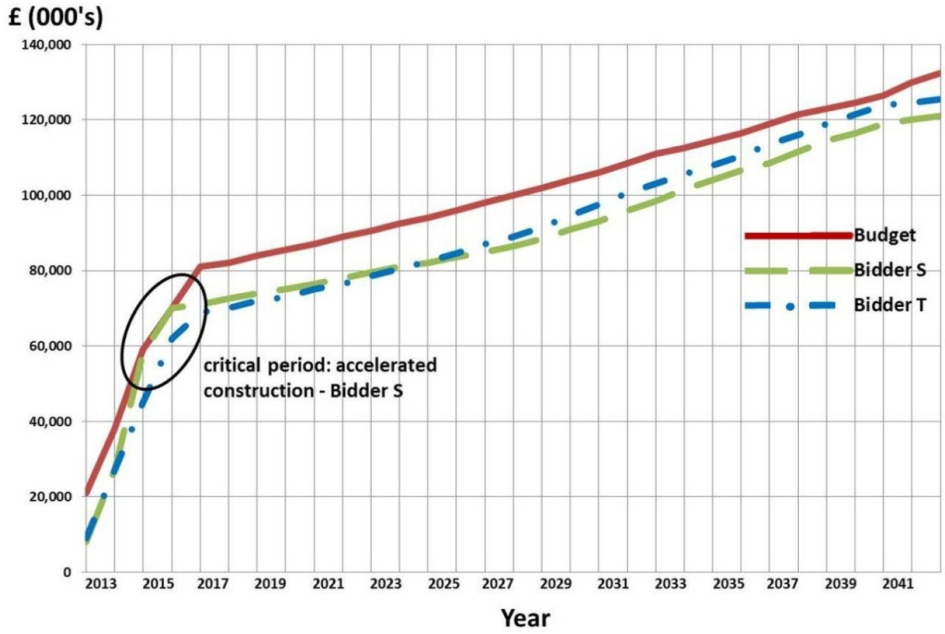

Figure 3: Financial Projections for Bidders S and T set against Budget

6. Conclusions and Further Developments

This paper charts the introduction of a large scale PFI project into a metropolitan local authority in England; against a background of concern about design quality. The establishment of a new competitive dialogue procedure was arguably the biggest change in relationships with the bidders and this was perceived by all parties as crucially important. However, it soon became clear that the deficiency in the process was how the designs would be evaluated. A review of existing evaluation tools revealed that they would not meet the specific requirements of the revised PFI procedure. Delays due to the Government's Spending Review enabled sufficient time for a new evaluation tool to be developed. The objectives were to inform the decision-making process in terms of selection of the preferred bidder, and to improve the design quality of all proposals. The tool was progressively applied to the selection stages and the results offered clear direction as to where the designs could be improved. It also quantified the improvements to the refurbishment schemes in comparison with the existing; and provided invaluable data to assist the selection of the preferred bidder. The results showed a significant improvement in design quality through the iterative process, although it was concluded that two reviews at stage 3 were probably sufficient. They also revealed the potential for assessing the quality of existing buildings as a means of informing redevelopment and refurbishment programmes. The Tool produced 156 evaluations from which clear patterns emerged. Nevertheless, the real outcome in relation to design quality will only be known when the post-occupancy evaluations are carried out in several years' time.

The Tool has been examined by the Homes and Communities Agency (HCA), the British Government's national housing and regeneration agency for England, whose the aim is to deliver high-quality housing that people can afford; and it is now included on the website at the following address, as an instrument setting new standards in design. http://www.homesandcommunities.co.uk/architecture-design-quality-evaluation-tool.

Discussions have taken place with RIBA Enterprises' National Building Specification (NBS) Team about the CREATE Specification Tool, which will be developed over 2013 to deal with briefing and design; and this will incorporate many of the ideas developed from the Tool and/or interoperate with the Tool itself. Following a presentation at the PPP/PFI Conference for Social Housing (London, September 2010), interest has been expressed by other English local authorities with early stage, large scale redevelopment proposals; and exploratory seminars have been undertaken. A condensed and more generic edition of the tool has been offered to MArch students at Northumbria University, to enable them to evaluate the development of their own studio design projects. A medium term objective is to identify the core of the Tool as a replicable standard, and generate specific sections for different building types. It was devised to suit the competitive dialogue phase of a PFI project, however it does not necessarily need to be limited to that form of procurement. The development of the tool with the National Building Specification team will undoubtedly require adaption to different building types and different forms of procurement. The favoured approach is a generic core with specific criteria tailored to the particular building types.

References

Burt, M.E. (1978) *A Survey of Quality and Value in Building*, Watford, Building Research Establishment.

CABE (2005) *Design Quality and the Private Finance Initiative*, London, The Commission for Architecture and the Built Environment.

Carmona, M. (2001) *Housing Design Quality: Through Policy, Guidance and Review*, London, Spon Press.

CIC (2003) *Design Quality Indicator*, London, Construction Industry Council.

Eley, J. (2004) "Design Quality in Buildings." *Building Research and Information* **32**(3): 255-260.

Evans, W. and Hartwich, O.M. (2005) *Unaffordable Housing: Fables and Myths*, London, Policy Exchange.

Gann, D.M., Salter, A. J. and Whyte, J.K. (2003) "Design Quality Indicator as a Tool for Thinking." *Building Research and Information* **31**(5): 318-333.

Giddings, B. and Holness, A. (1996) "Quality Assessment of Architectural Design and the Use of Design Award Schemes." *Environments by Design* **1**(1): 53-68.

Giddings, B., Sharma, M., Jones, P. and Jensen, P. (2010) "Architectural Design Quality in Local Authority Private Finance Initiative Projects", *Proceedings of the CIB World Congress: Building a Better World,* 10-13 May, The Lowery, Salford Quays, UK.

HM Treasury (2008) *Competitive Dialogue in 2008: OGC/HMT joint guidance on using the procedure*, Norwich, Office of Government Commerce.

Manning, P. (1991) "Environmental Aesthetic Design: identifying and achieving environmental effects, particularly 'image' and 'atmosphere." *Building and Environment* **26** (4): 331-340.

Miller, D.C. and Salkind, N.J. (2002) *Handbook of Research Design and Social Measurement, 6th ed.,* London, Sage Publications Inc.

North Tyneside Council (2007) *Housing Strategy 2006-2010,* Killingworth, Housing Support and Development.

Office of Government Commerce (2007) *Design Quality: Achieving Excellence in Construction Procurement Guide*, London, Office of Government Commerce.

Parker, C., Barnes, S., McKee, K., Torrington, J. and Tregenza, P. (2004) “Quality of life and building design in residential and nursing homes for older people.” *Ageing and Society* **24**: 941-962.

Sudha, N., and Baboo, S. (2011) “Evolution of new WARM using Likert Weight Measures (LWM).” *International Journal of Computer Science and Network Security* **11**(5): 70-75.

Thomas, J.C. and Carroll, J. (1984) “The Psychological Study of Design,” in Cross. N.(ed), *Developments in Design Methodology*. Chichester, John Wiley and Son, 83-95.

Treasury Taskforce (2007) Technote 7: *How to Achieve Design Quality in PFI Projects*, London, The Public Enquiry Unit HM Treasury.

http://www.homesandcommunities.co.uk/hqi (Accessed 13 November 2012).

http://www.homesandcommunities.co.uk/ourwork/design-and-sustainability-standards (Accessed 13 November 2012).

http://www.housinglin.org.uk/Topics/browse/Design/DesignGuides/?parent=6594&child=7997 (Accessed 13 November 2012).

http://webarchive.nationalarchives.gov.uk/20110107165544/http:/www.buildingforlife.org/criteria/ (Accessed 13 November 2012).